

The Institution of Engineers, Australia: Sydney Division
Engineering Heritage Committee
ORAL HISTORY PROGRAM

INTERVIEW TAPE LOG

INTERVIEWEE: **Dr John NUTT AM**

TAPE NUMBERS: **IEA SYD: MC 13 to 20**

INTERVIEWER: **Michael Clarke**

DATE: **14 February and 17 February 2000**

NUMBER OF TAPES: **8**

RESTRICTIONS ON USE: **None**

LOG PREPARATION: **Sanyo Memo-Scriber TRC - 8080**

Tape: **IEA SYD: MC 13 Side A**

14 February 2000

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 04	Tape identification.	
04 - 92	John Gilmour Nutt, born 19.8.34 Townsville, North Queensland. Family background. Father an engineer and surveyor in private practice. Father retired in mid 1960s.	Townsville, North Queensland. Glasgow. Bendigo; Sydney Harbour Bridge. John McIntyre. Phil Brazier. Burnett River. Department of Main Roads. Emmanuel College. John Kemp Commissioner for Main Roads. Vic Crawford.
93 - 186	Schooling affected by World War 2. Townsville bombed - sent south to Toowoomba then Cremorne Public School Sydney. Returned to Townsville 1943. Comment on change due to war of north Queensland from isolationist with separatist movements to integration with Australian scene. Townsville Grammar then south to boarding school.	Sydney. Cremorne Public School. Dave Issacs of Experimental Building Station. Townsville Grammar. Phil Issacs.
187 - 265	Choosing engineering as a career. University of Queensland 1951. Kings College. Had Commonwealth Scholarship.	University of Queensland. Kings College. Bob Menary, later Professor of Agriculture, University of Tasmania.
266 - 347	Busy social life at university. Influences at university - John Lavery ex. Rhodes Scholar. Encouraged Nutt to stay on for a year as a demonstrator and to go overseas.	Prof. John Lavery. Sir Richard Southwell. Southwell Plot. Oxford University. Bini domes.
End side A, tape MC 13		

Tape: **IEA SYD: MC 13 Side B****14 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 87	Activities whilst a demonstrator at Queensland University. Comments on need for young engineers to work in a different environment preferably overseas.	George Birkbeck, Lecturer in Soil Mechanics. John Lavery. Hardy Cross.
88 - 363	Decision to go to Manchester. Giants of the computer world at Manchester - produced the first electronically stored computer program in the world - "Baby". Building "MUDEC" for Ferranti. Livesley published paper about 1952-53 that founded the stiffness approach to the analysis of highly redundant structures. Nutt researched instability and buckling strength of steel structures and effects of plastic methods of collapse. Gained a PhD 1959. Comments about Prof. Matheson. Comments about engineering research and the importance of engineering judgment. Linear electric motors. Importance of informal contact in an organisation to foster creativity.	Prof. Louis Matheson. Noel Murray (later Foundation Prof. of Civil Eng. at Monash). Peter Rowe. Freddy Williams. "Baby". "MUDEC". Ferranti. Prof. Hartree. Ken Livesley. Argyris and Henderson. John Baker of Cambridge. Prof. Osborne Reynolds ("Reynold's Number") Manchester. Prof. A H Gibson Manchester. Prof. Len Stevens, Melbourne University. Eric Laithwaite.
End side B, tape MC 13		

Tape: **IEA SYD: MC 14 Side A****14 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 03	Tape identification.	
04 - 118	Post PhD activities - teaching structures and computer applications at Manchester for 12 months. In 1957 married Roberta who he had met at Uni. in Queensland. Joined Arups April 1960. Description of Arups at the time.	Matheson. Monash University. Prof. Michael Rex Horne. John Baker. Ove Arup. Arups. Christiani-Nielsen.
117 - 336	Initial work performed at Arups. Redevelopment of St Pauls-Barbican area of London; design of high rise buildings; noise acoustic and wind problems. Prepared Technical Note for Arups that became the basis of prediction of wind loads on buildings and structures for a number of years. Importance of collaborating with research establishments and maintaining their viability.	Jack Waller. Peter Dunican. Institution of Structural Engineers. St Pauls-Barbican area of London. London School of Music. Barbican Concert Hall. Peter Grootenhuus. Ron Carter of NZ. Murray Lowe. Alan Davenport. Uni. of Western Ontario. Barry Vickery. Bill Melbourne of Monash Uni. Christopher Scruton of National Physical Lab. UK
End side A, tape MC 14		

Tape: **IEA SYD: MC 14 Side B****14 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 234	Start of work on Sydney Opera House end 1961, start of 1962. Description of original roof concept and design problems. Arup's shell expert, Ronald Jenkins was responsible for roof design. Evolution of rib support for shells. Louvre walls abandoned and roof became a skeletal rather than shell structure. Devastating effect on Ron Jenkins and his team. Zunz became the project director with a team drawn from the best in Arups - Peter Rice, Nutt, Joe Huang, John Lethbridge, Ted Happold, David Dowrick etc.	Sydney Opera House. Utzon. Arup. Ronald Jenkins. Hugo Mollman. Hellebaeck. Jack Zunz. Peter Rice. Joe Huang. John Lethbridge. Ted Hapolt. David Darack.
235 - 376	Solution to geometry of Opera House and evolution of concept of precasting. Sphere was the solid shape that allowed repetition in precasting.	
End side B, tape MC 14		

Tape: **IEA SYD: MC 15 Side A****14 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 02	Tape identification.	
03 - 39	Continuation of solution to geometry of Opera House. Reduction of space in side foyers due to spherical solution and the affect on design of halls and reduction of seating.	
40 - 45	Opera House - the first computer-age building - forefront of the analysis of highly complicated and redundant structures.	
46 - 153	State of technology when Opera House being designed. Application of computers to design of shells. Radius of Opera House spheres is 246 feet. Determination of geometry and analysis would not have been possible without computers. Computer applications flowed through the whole of the design and construction of the building.	Jenkins. Ferranti. Sirius computer. Peter Rice. Alan Baker.
154 - 307	Jack Zunz (about 37 or 38 in 1961) - combined an engineering judgment with a practicality; and possessed of great integrity. Comment on the various roles and necessary skills (other than straight engineering) of a consultant. Client's techniques of assessment. Zunz took two major decisions - ensured there was no separation between the designers and the builders; and recognised that the strategy of building needed to be injected into the design at an early stage and negotiated appointment of the builder. M R Hornibrook selected as builder in 1962 with Corbet Gore as Project Manager. Selection from two civil engineering contractors as opposed to building firms.	Jack Zunz. Michael Lewis. M R Hornibrook. Corbet Gore. George Bolton. Bob Kynaston.

Continuation of tape: **IEA SYD: MC 15 Side A**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
308 - 370	"integrated iterative process" . "thinking generously".	"integrated iterative process" . "thinking generously".
End side A, tape MC 15		

Tape: **IEA SYD: MC 15 Side B****14 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 124	Discussion of role of architect Utzon's creativity and iterative process between engineer and architect in devising solutions. Maintenance of balance between creativity and innovation and predictability, elimination of failure and waste. Comment on difference in parameters established by Utzon and his client.	Utzon. Oliver Sacks. Creativity, innovation, predictability, failure and waste. Peter Rice an "oddball".
125 - 178	Discussion of the elements that contributed to creating the "Opera House controversy". Comment on value of architectural competitions and changes resulting from the Opera House.	Cahill.
179 - 330	Discussion about deterioration of relationships between Utzon, Arups, the client and others. Description of relationship between Utzon, Arups and other consultants.	Ryan Minister for Public Works. Utzon.
331 - 356	Discussion about evidence of approaching departure of Utzon. Came as a surprise to everyone.	Utzon.
End side B, tape MC 15		

Tape: **IEA SYD: MC 16 Side A****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 04	Tape identification.	
05 - 55	Effect of Utzon's departure on Arups and the Opera House. Ove Arup looked upon Utzon as one of the great architects of our time. Importance of all the detail coming out of a single mind.	Arups. Ove Arup. Utzon.
56 - 154	Comment on the treatment of Utzon. Arups found client to be understanding, sympathetic, tolerant and supportive. Zunz an honourable leader of great integrity. Comment on need to give people room in order to encourage lateral thinking - project cannot be assessed on a day-to-day basis. Relationship between Utzon and client changed over time.	Zunz. Messr Yves Guyon foremost prestressing engineer. Department of Public Works. Government Architect's Branch.

Continuation of tape: **IEA SYD: MC 16 Side A**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
155 - 259	Discussion about folded beams over vehicular concourse. Utzon wanted to engender a sense of heightening expectation in patrons as they arrived - the monumental steps were part of this concept. Difficult problem to solve (at that time) within the architectural philosophy.	Utzon. Gifford-Udall Contract arbitration. QCs - Nigel Bowen, Neville Wran, Tony Mason, John Kerr. "Ship jacking".
260 - 378	High and low points in evolution of the Opera House. Demolition of columns due to design changes. Importance of morale in a design team when taking difficult decisions - need to separate the political pressure from the technical aspects.	Bob Kelman. Mike Smith, Department of Mines. Morale.
End side A, tape MC 16		

Tape: **IEA SYD: MC 16 Side B****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 02	Tape identification.	
02 - 16	Discussion on support of roof. Feet of roof arches tied together.	
17 - 84	Anecdotes involving people. Setting out three dimensional structure in space.	Peter Rice. Jim O'Sullivan. Ron Bergin. Mike Elphick. First and Last Hotel. Oriental Hotel.
85 - 133	Design and construction lessons learnt from the Opera House. Advantages of a symbiotic relationship between architects and engineers. A computer building. Techniques of prestressing. Epoxy resins. Ferro cement in tile lids.	Computer building. Prestressing. Epoxy resins. Ferro cement.
134 - 207	Project management lessons. Need to critically select types of contracts for complicated buildings where outcome is not totally predictable. Stifled uncontrolled architectural competitions for a long time. Weakness was lack of a participatory client in the early days.	Critical Path techniques. Contract selection.
208 - 232	Management structure if Opera House was being built in 2000. Would probably not produce the same result.	
233 - 299	Discussion of moves to change work carried out post Utzon. Support for auditorium ceilings.	
300 - 348	Opera House master plan and items of important heritage significance. Utzon invited to be a consultant.	Architects - Denton Corker Marshall. Richard Johnson. Utzon.
End side B, tape MC 16		

Tape: IEA SYD: MC 17 Side A

17 February 2000

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 04	Tape identification.	
05 - 77	Discussion of David Messent's book <i>Opera House Act One</i> . An accurate and useful record.	David Messent. <i>Opera House Act One</i> . John James. Medieval cathedrals.
78 - 344	Establishment of Ove Arup's practice in Australia. Request to Arup from local group working on Opera House. Ownership transferred over time from group of British partners to an Australian staff-owned trust at no cost. Now applies to all Arup practices under a no individual ownership arrangement - "naked in, naked out". Discussion of criteria for success of a consulting practice. Description of Arup structure, legal and operational arrangements.	Ove Arup. McDonald Wagner & Priddle. Malcolm Nicklin. Ian McKenzie. Eric Wagner. Ray Priddle. Frank Hole.
End side A, tape MC 17		

Tape: IEA SYD: MC 17 Side B

17 February 2000

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 02	Tape identification	
03 - 212	Discussion of Nutt's management philosophy. Believes in development of people through self reliance away from the "boss", developing people skills and relationships with clients - giving people opportunities. 70% of work comes from existing clients.	Peter Thompson. Greg Hodgkinson. Ross Clarke. New York. JFK Airport. Pearson Airport, Toronto Canada. Salt Lake City Airport. Richard Hough.
213 - 337	Business comes through doing work well and through putting an appropriate value on your services. Management, business and money skills just as important as the engineering. Should always "leave something on the table" - don't take advantage of disorganised client. Hunt for the "challenge" and strive for innovation. Important to look at a building as an on-going environment for those living or working in it - whole of life and use design.	
338 - 364	Discussion of landmark projects - Opera House.	
End side B, tape MC 17		

Tape: **IEA SYD: MC 18 Side A****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 03	Tape identification.	
04 - 179	Continuation of discussion of landmark projects. Timber Food Services Building in Woden, Canberra in mid 60s. Comment on importance of research and its significance to the manufacturing industry. Importance of understanding buildability in the design function. 25 Bligh Street, Sydney. ABC site in Darlinghurst. Capital Tower, Melbourne - building proposal used with great success on high rise building in Singapore.	McKay and (Phillip) Cox. Food Services Building, Woden, Canberra. Mosquito aircraft. Hudsons. Jack Boyd. Nick Trahair, Sydney Uni. Bill Melbourne, Monash Uni. IM Pei, New York.
180 - 251	Discussion about Bini shells constructed by Public Works Department as multi-purpose halls for schools, and their failure.	Bini. Michael Rotter, Uni. of Sydney.
251 - 353	Discussion about engineering excellence and its development in teams and organisations. Establishing the right corporate culture, role models, space for the odd ball individual.	Arups. Peter Rice.
End side A, tape MC 18		

Tape: **IEA SYD: MC 18 Side B****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 02	Tape identification.	
03 - 140	Discussion about developing cooperative relationships with architects in building design. Respect for architect's design philosophy. Universities teach engineering analysis, but are not good at teaching design. Respect for other disciplines. Can't divide engineering and practice.	Engineering design. It (Information Technology).
141 - 218	Discussion of changes in building procurement practice and their implications.	
219 - 377	Discussion of Australian Standards Loading Committee - membership commenced about 1965. Work removed some great anomalies and deficiencies. Recognised the sophistication of modern tall buildings and the fact that they move.	Australian Standards Loading Committee. Macmillan Briton & Kell. Michael Lewis. Prof. Len Stevens, Uni. of Melbourne. Arup Fellowship. Bill Melbourne of Monash Uni. Charles Bubb, Chief Engineer Commonwealth Department of Works. Holmes, CSIRO. George Walker. Wind Engineering Code, Loading Code, Limit State Code. Tacoma Narrows Bridge.

Tape: **IEA SYD: MC 19 Side A****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 04	Tape identification.	
05 - 212	Discussion of Australian Building Regulations Review Task Force (Chair 1989-91). Complicated by changes in government ministers and heads of government departments. Looked at fire engineering. Recommended: A national organisation to administer an on-going set of regulations with an industry chairman (Australian Building Control Board); performance-based building codes; proper funding of on-going maintenance of regulations; housing be looked at differently; one-stop-shop integration of planning and building approvals.	Australian Building Regulations Review Task Force. Performance -based building codes. Fire engineering. Warren Centre. Jim Service, first Chair Australian Building Control Board.
213 - 243	Not involved in Giles Royal Commission on construction industry reform.	Giles Royal Commission on construction industry reform.
244 - 382	Involvement in Civil Engineering Advisory Committee of University of Technology, Sydney commencing in 1993. Chaired Queensland University review about 1994/95.	Civil Engineering Advisory Committee of University of Technology, Sydney. Brian Smith. Peter Parr. Peter Johnson. John Simmons. Ian Mair.
End side A, tape MC 19		

Tape: **IEA SYD: MC 19 Side B****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 02	Tape identification.	
02 - 76	Continuation of discussion of changes in structure of engineering teaching at University of Technology, Sydney. Chair of Industry Advisory Network.	University of Technology, Sydney, Industry Advisory Network.
77 - 233	Discussion of establishment, operation and value of the Arup Engineering Fellowship Program. Criteria not unlike that of a Rhodes Scholar. Offer other scholarships for tertiary study.	Arup Engineering Fellowship Program. Chris Letchford. Lisa Siganto
234 - 277	Mention of awards received by Dr Nutt. Most satisfying is Peter Nicol Russell Award from The Institution of Engineers, Australia.	Peter Nicol Russell Award Prof. Roger Tanner.
278 - 326	Tribute to Mrs Nutt. (Publishes a family magazine of 60 odd pages every 3 or 4 months). Five children.	
326 - 363	Retired July 1999. Retirement activities: Rotary Club of Sydney, Community Services Committee; University of Technology, Sydney (UTS); fire engineering research.	Rotary Club of Sydney. University of Technology, Sydney. Fire engineering research.
End side B, tape MC 19		

Tape: **IEA SYD: MC 20 Side A****17 February 2000**

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
00 - 04	Tape identification.	
04 - 46	Importance of involvement of industry in education of engineers. Modus operandi of University of Technology, Sydney, Industry Advisory Network.	University of Technology, Sydney, Industry Advisory Network.
47 - 86	Continuing involvement with Arups, but not interfering with management. Mixes socially and professionally with young engineers, maintaining professional standards.	
87 - 102	Sporting interests and family activities. "Nuttfest 2000".	
103 - 120	Closing comments.	
End side A, tape MC 20 END OF INTERVIEW		